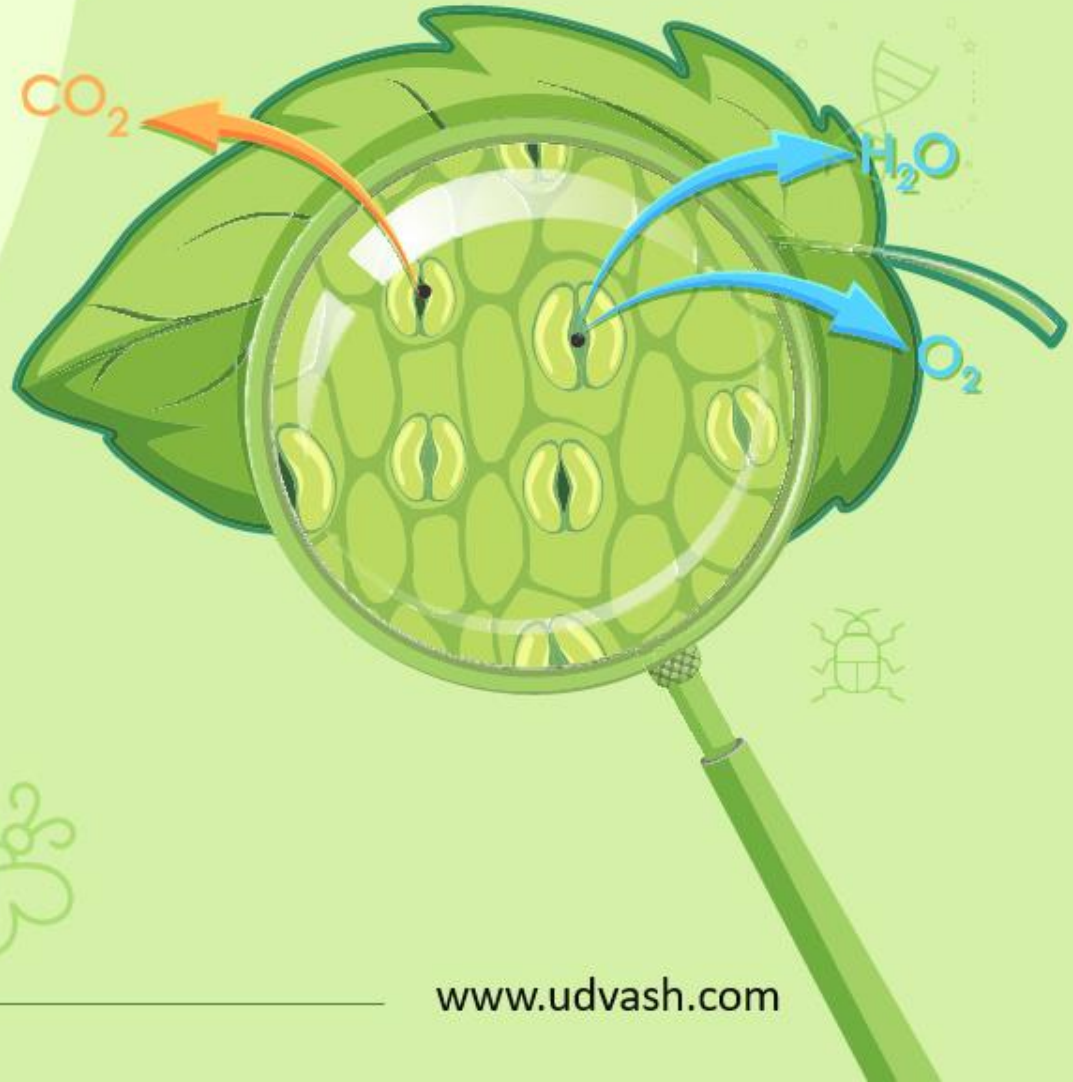
Class 10 Academic Program-2020

BIOLOGY 1ST PAPER

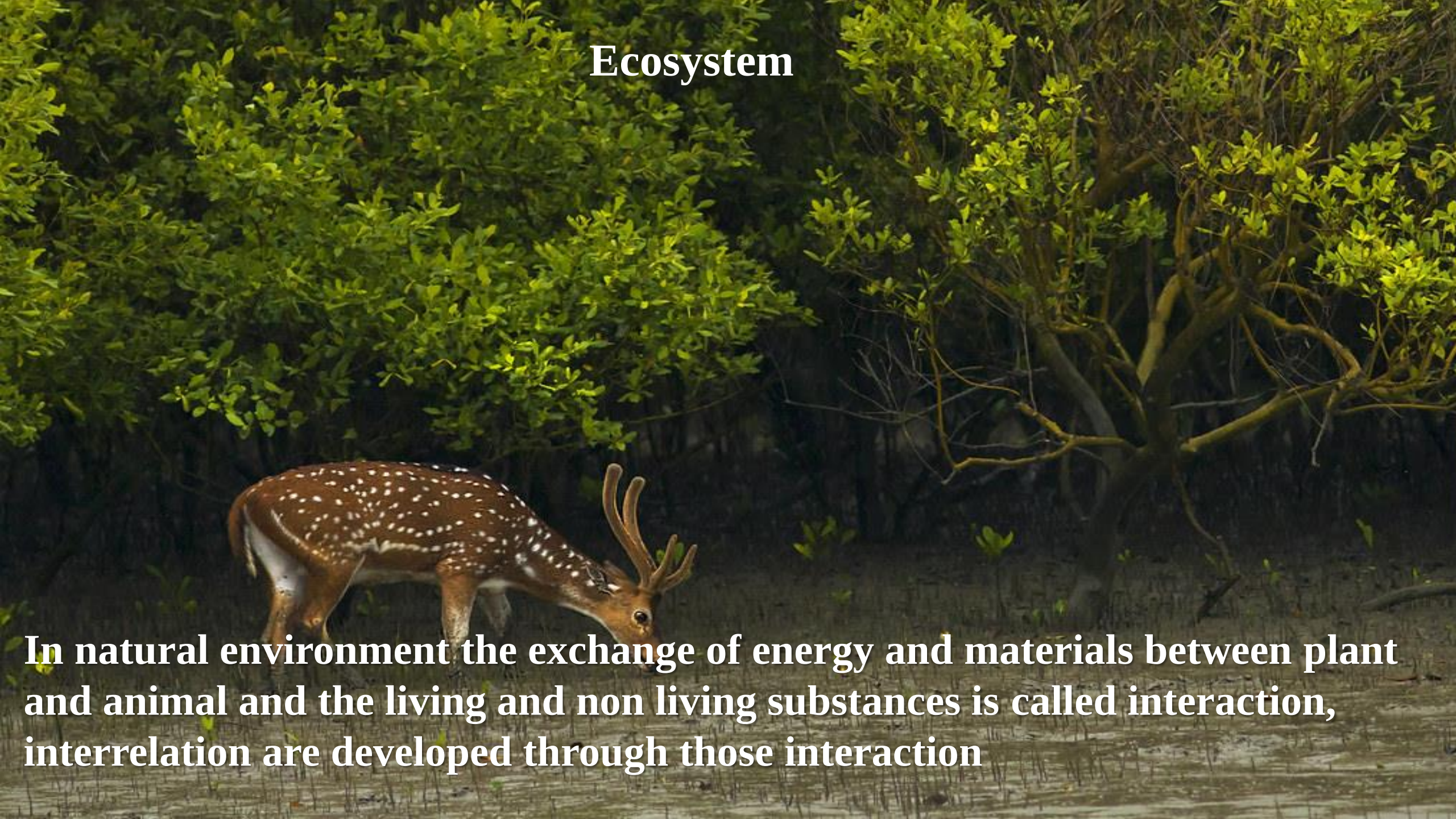
Lecture : B-32

Chapter 13 : Environment of Life




Environment of Life
Rahatul Ishakh Anonnoy

Ecosystem



In natural environment the exchange of energy and materials between plant and animal and the living and non living substances is called interaction, interrelation are developed through those interaction

Elements of the ecosystem

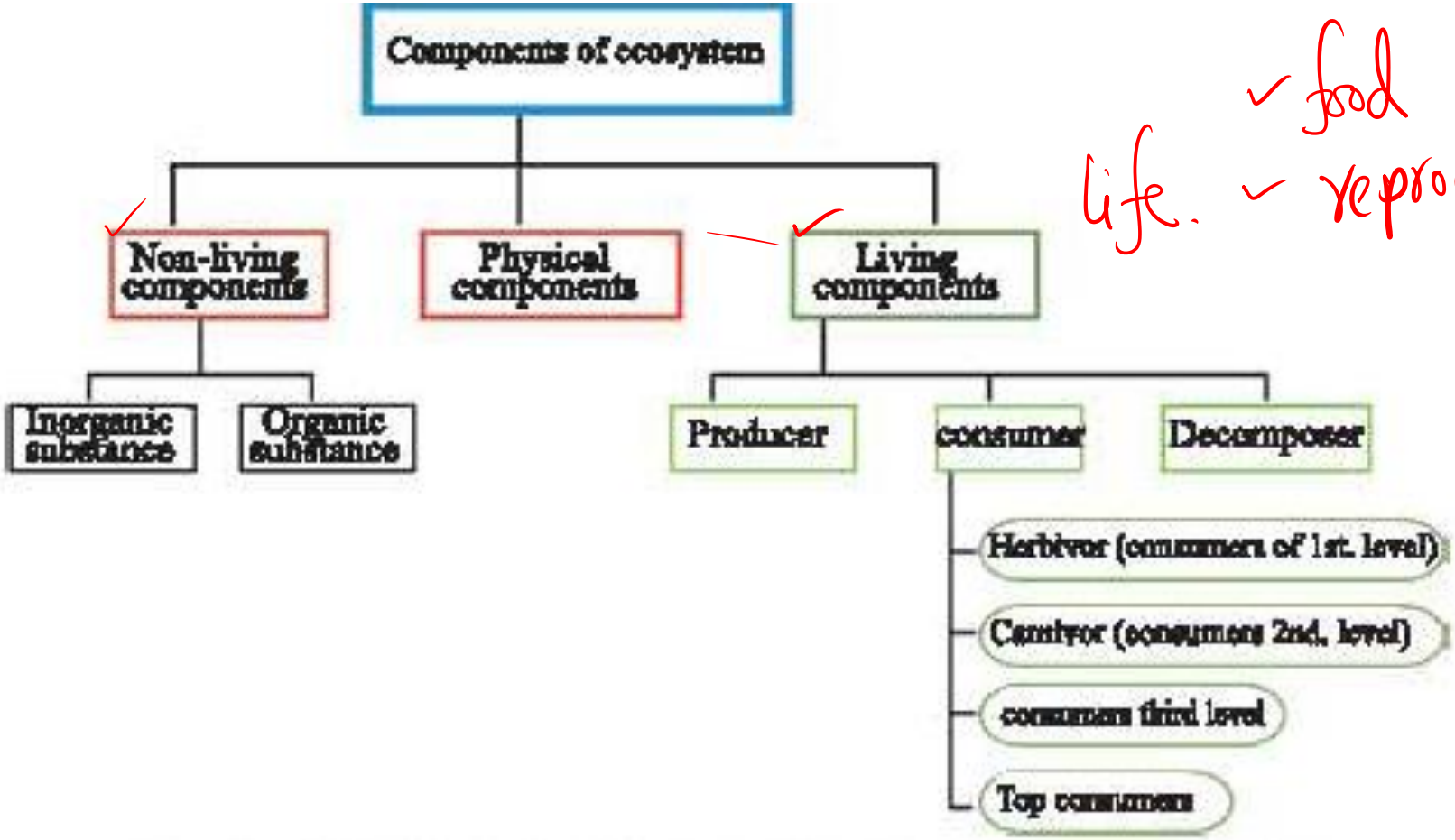


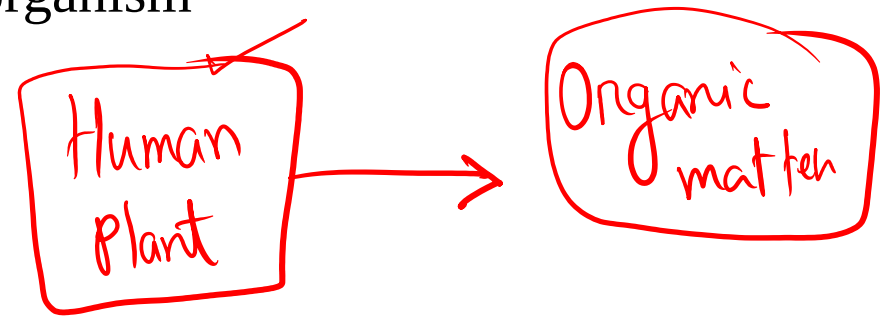
Figure: 13.01 Components of an ecosystem (in a chart)

Non-living matter

i) Inorganic matter: was in the environment before the origin of the organism

Example: calcium, potassium, iron, nitrogen, oxygen, carbon dioxide

ii) Organic matter: comes from the carcass of an organism



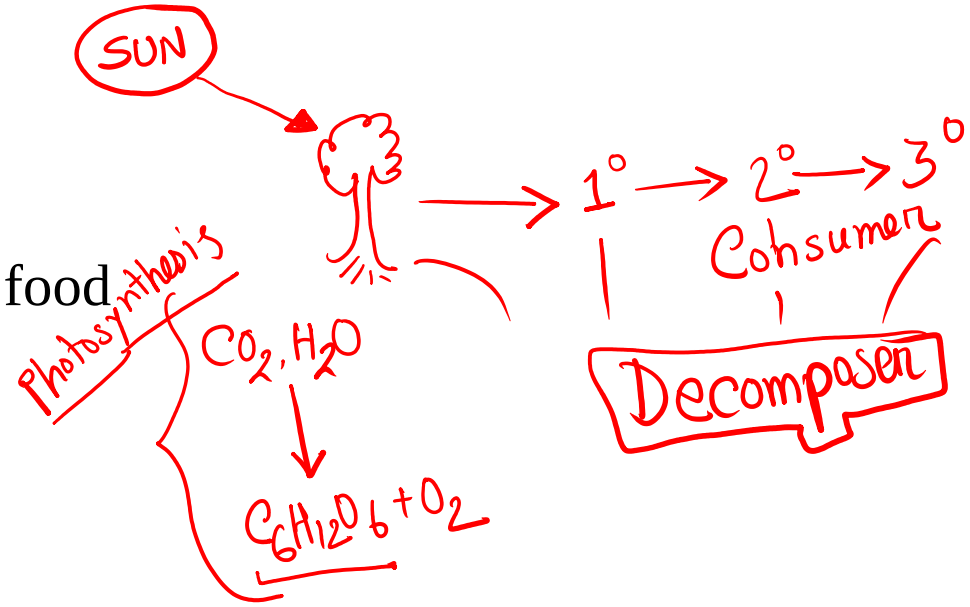
Example: humus

Physical element

* The amount of sunlight
* Temperature
* The amount of water vapor
* Air pressure
* Airflow
* Depth from sea level
* Height

Biological material

i) Producer : Produces carbohydrates



ii) Consumer : Depending on the producer for food

* Carnivorous Tiger
* Herbivores Cow
* Omnivorous Human, Cow
* Scavanger

iii) Decomposer : Takes food from waste products and carcasses

Poll question 01

Which is the physical element of the ecosystem?

a) Water

b) Carbon dioxide

c) Humidity

d) Humus

Ecology of the pond

Zoo ← plankton
phyto ← plant

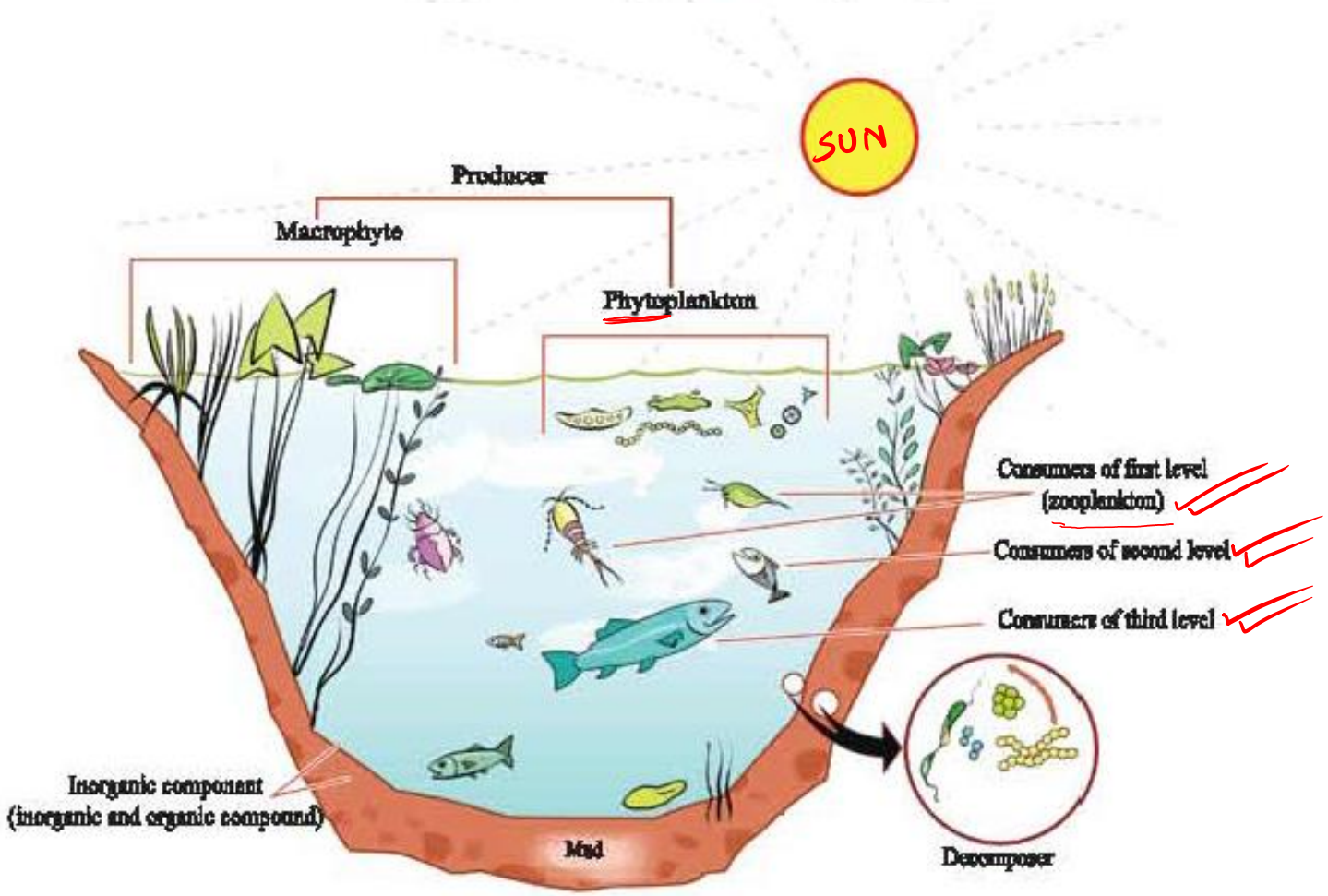


Figure: 13.02 A pond ecosystem

Producer: Phytoplankton, algae

First level eater: floating tiny insects, mosquito larvae, microscopic animals, zooplankton, rui, catla

Second level eater: small fish, some insects, toads

Third level eater: shoul, boal, bhetki, stork

Decomposer: Fungi, bacteria

Poll question 02

As a consumer, bhetki fish is in-

(a) Primary level 1°

(b) Secondary level 2°

(c) Tertiary level 3°

(d) Quarterly level 4°

Quarternary

Food chain / food chain

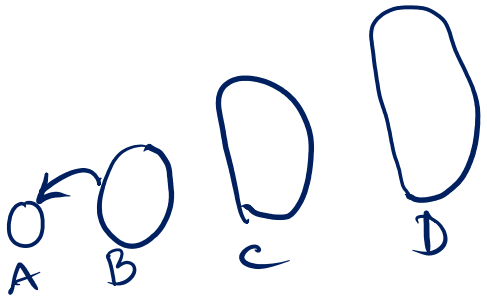
When food energy flows from producer to different levels of eater, that flow is called food chain.

Grass → grasshopper → toad → snake → gui sanke

Types

i) Predator food chain

* The smallest of the first level eater sizes
* Periodically the top eater eats what their prey eats



ii) Parasitic food chain

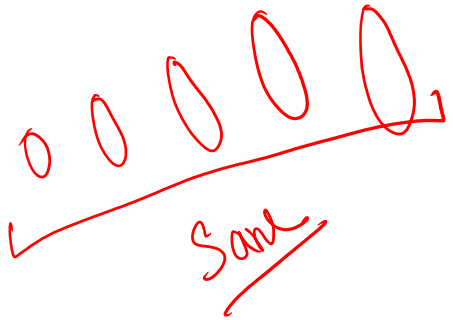
* Parasites take food from large hosts
* Sometimes smaller parasites are dependent on parasites

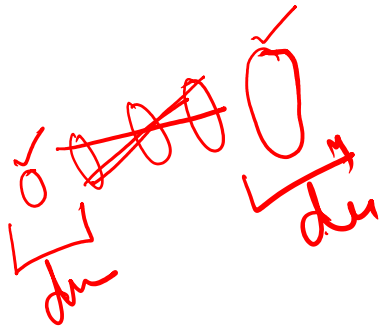
People → mosquitoes → dengue virus

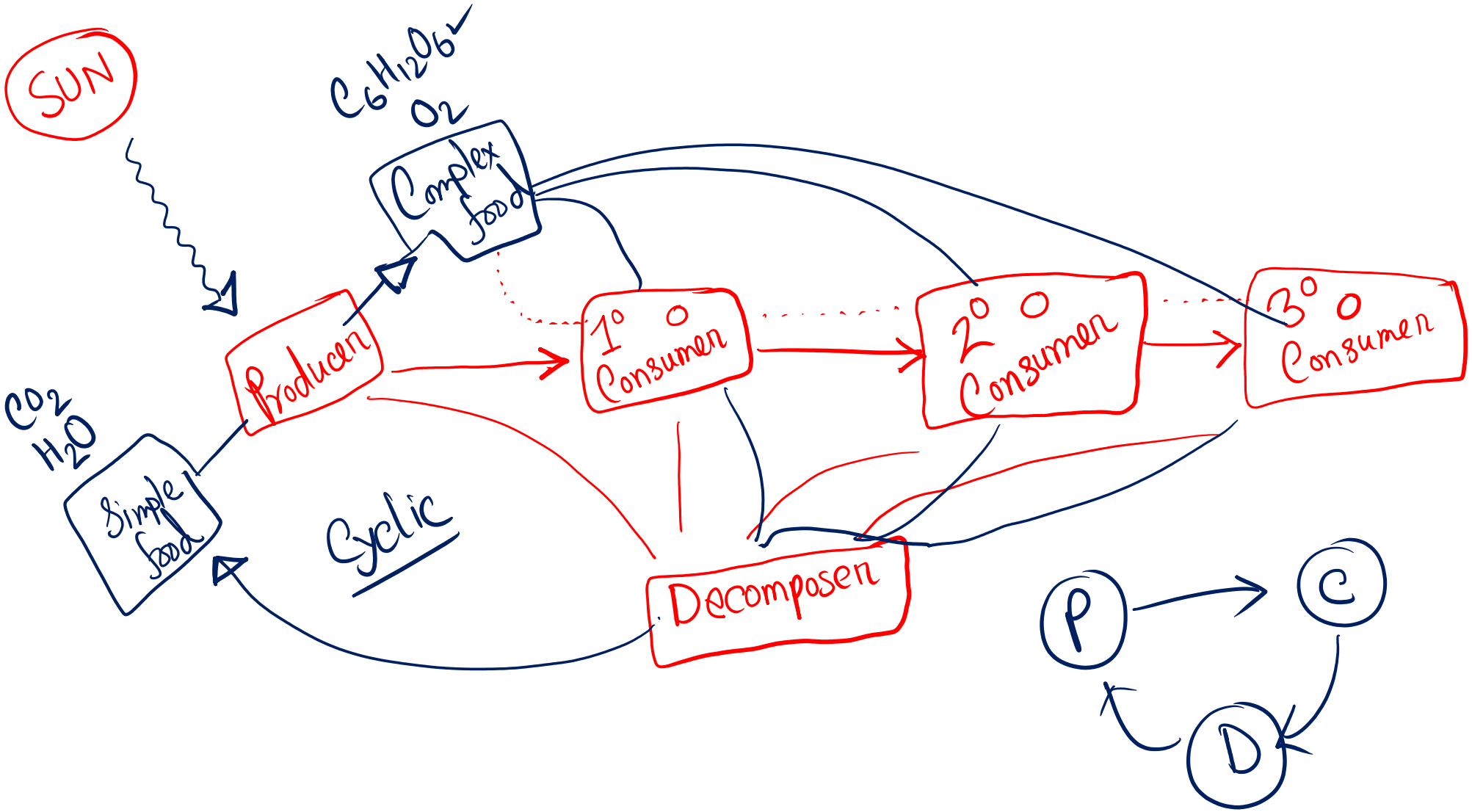
iii) Saprophytic food chain

* The food chain begins with the carcass

Dead body → fungi → earthworms






SUN
$C_6H_{12}O_6$
O_2
Complex food
Producer
1° Consumer
2° Consumer
3° Consumer
CO_2
H_2O
Simple food
Cyclic
Decomposer
P
C
D

Food web

A mesh-like structure formed by the interaction of multiple food chains is called a food web

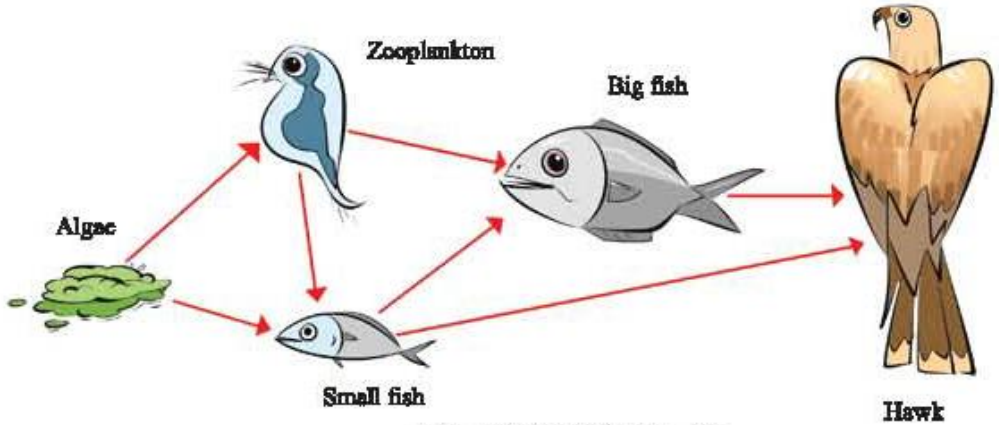


Figure: 13.03 Food web

A total of five food chains are found in the upper food web

1. Algae → small fish → hawk
2. Algae → zooplankton → big fish → hawk
3. Algae → small fish → big fish → hawk
4. Algae → zooplankton → small fish → big fish → hawk
5. Algae → zooplankton → small fish → hawk

Forest ecosystem food web

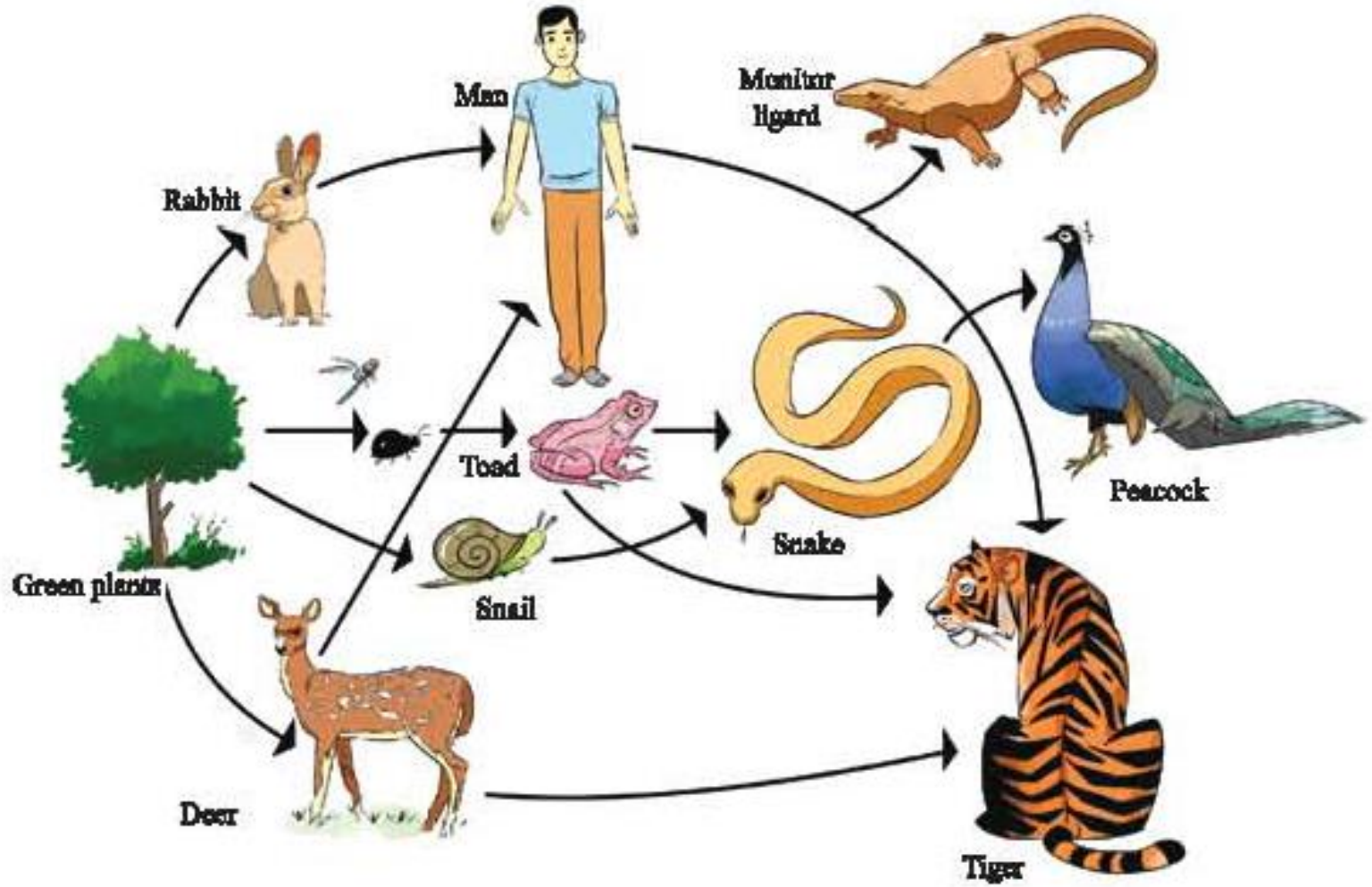


Figure: 13.04 A food web of forest

The flow of nutrients in the ecosystem

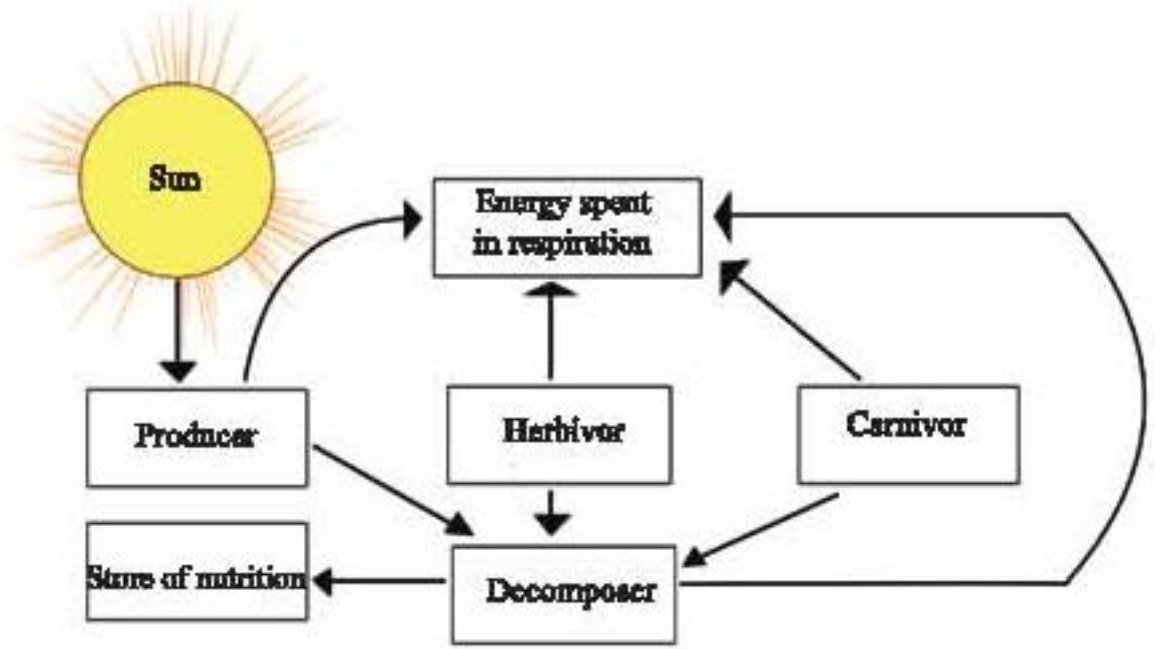
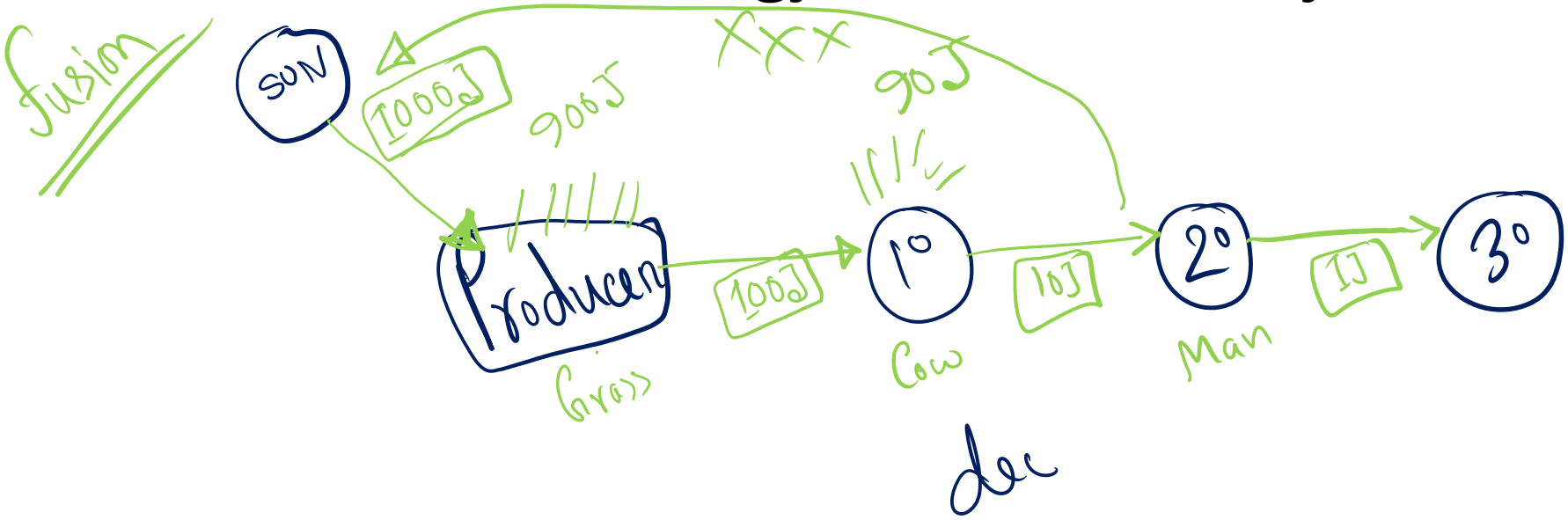


Figure: 13.05 Brief chart of the flow of nutrition and energy

* Nutritional flow is cyclical

Energy flow in the ecosystem



* The main source of energy in the ecosystem is the sun

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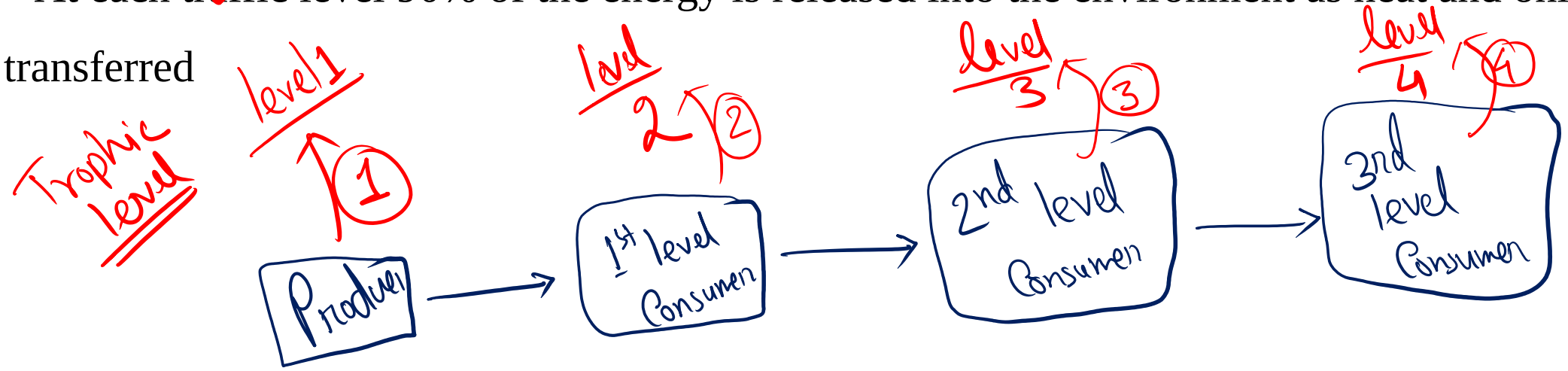
* One way flow of energy

* At each level of all types of food chain some amount of energy is wasted

* The lower the number of food levels in the chain, the less energy is wasted

Relation of energy between trophic levels

* Each level of the food chain is called the trophic level
* Producer represent minimum trophic level
* Herbivorous / first level consumer represent second trophic level
* Higher carnivorous represent highest trophic level
* At each traffic level 90% of the energy is released into the environment as heat and only 10% is transferred



Concept of energy pyramid

The energy storage and transfer arrangement of each level attached to the food chain is called the energy pyramid.

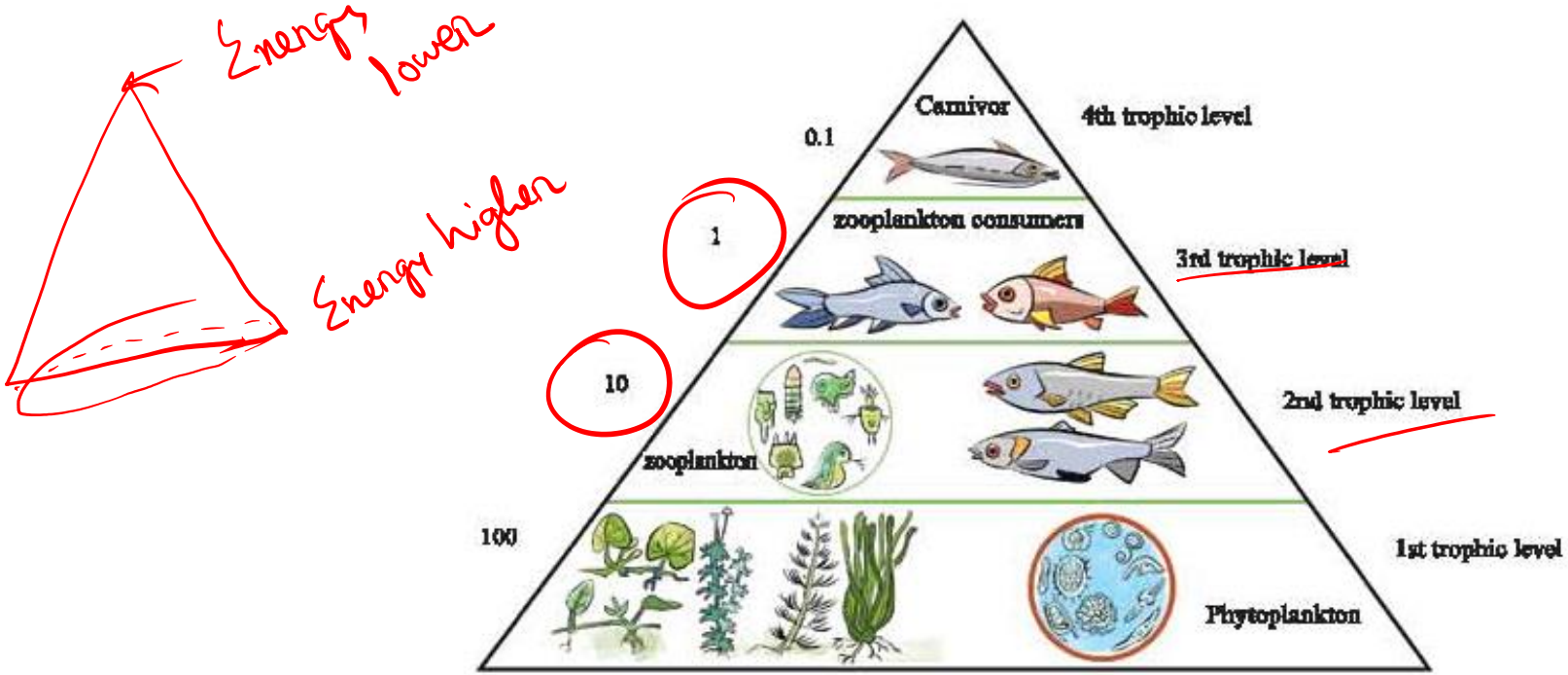
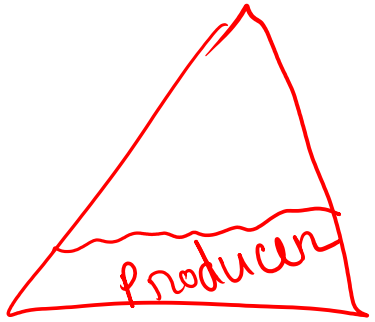


Figure: 13.06 Energy pyramid

At higher trofic levels the amount of energy decreases as more heat energy is lost in respiration and other activities.

Poll question 03

Where is the producer located in the pyramid?



a) on the edge

b) on the base

c) on the surface

d) at the apex

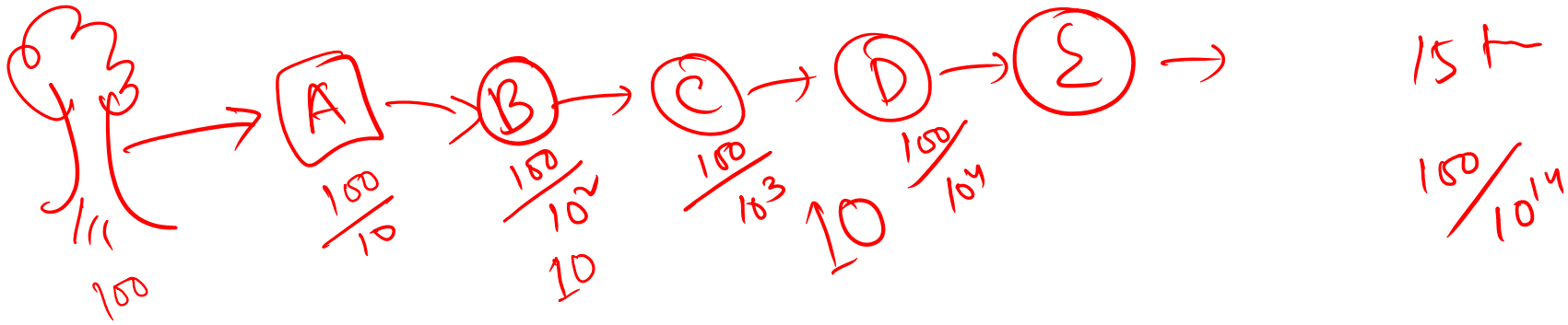
The effect of energy pyramids to keep food chains limited

* Energy flow is always one-way

* It can never be reversed

* About 90% energy is lost in each step

* Ever-increasing loss of energy limits the food chain area to 4 or 5 steps



Biodiversity

* Biodiversity is the abundance and diversity of the living beings on earth

* 13 lakh animal species have been named

* 4 lakh plant species have been named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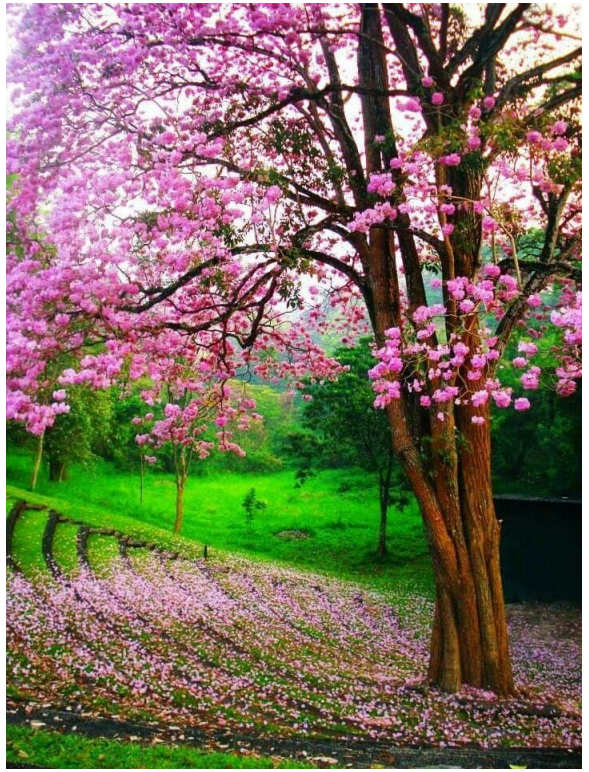
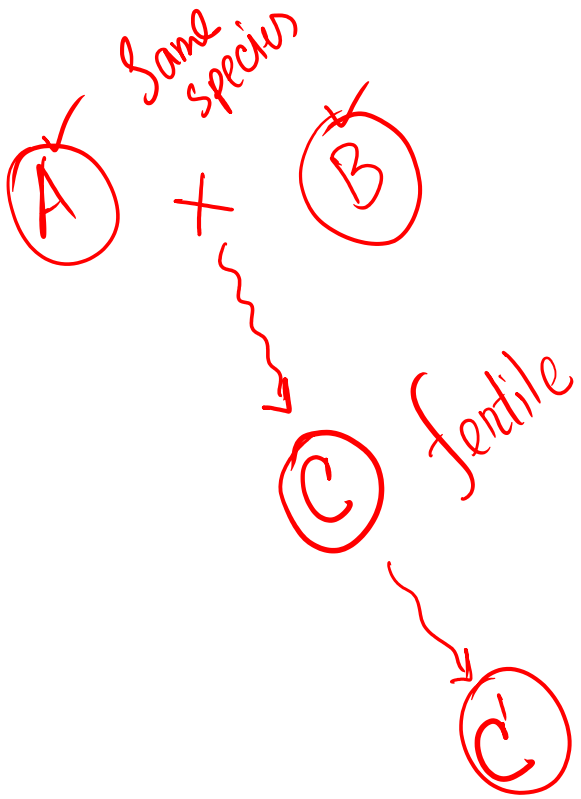
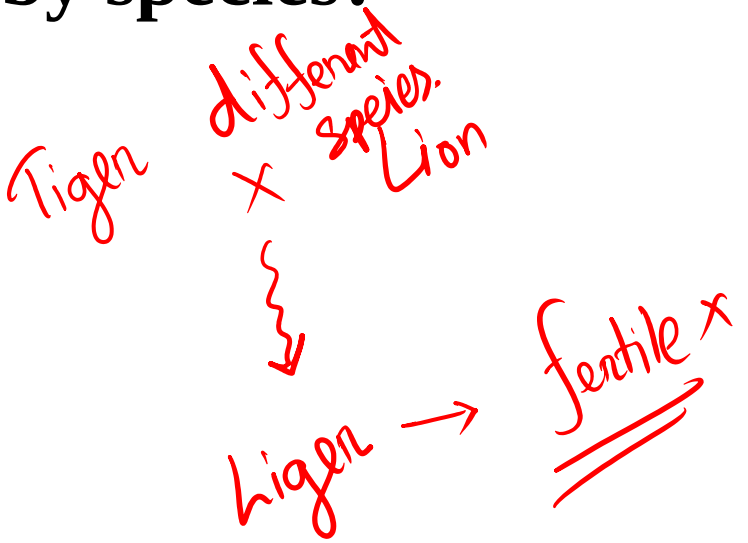


Botanical diversity

What is meant by species?





Biodiversity types

1. Species diversity: differences between tigers and deer

Homo sapiens

P. tigris

2. Genetic diversity: caused by a slight variation in the organization of genes, presence of different varieties of paddy

Homo sapiens

Oryza sativa

3. Ecological diversity: biodiversity resulting from adaptation

Impact of biodiversity in maintaining the stability of the ecosystem

* The balance of the environment is established through the activities of a large number of organisms

* Animals that were once considered unnecessary have played an important role in protecting the environment, such as things on the Chesapeake coast of the USA that could purify the water of an entire area in three days

* Every organism is necessary and plays a role in maintaining ecological stability

Figure 13.07: Vulture, kite and crow regularly cleans the garbage of nature

লেগে থাকো সৎ ভাবে,
স্বপ্ন জয় তোমারই হবে।